FACT SHEET FOR NPDES PERMIT WA0040231
Port of Olympia/East Bay Development
March 2009

PURPOSE of this Fact Sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for the Port of Olympia/East Bay Development.

The Environmental Protection Agency (EPA) developed the NPDES permitting program as a tool to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." EPA delegated to Ecology the power and duty to write, issue, and enforce NPDES permits within Washington State. Both state and federal laws require any industrial facility to obtain a permit before discharging waste or chemicals to a water body.

An NPDES permit limits the types and amounts of pollutants the facility may discharge. Those limits are based either on (1) the pollution control or wastewater treatment technology available to the industry, or on (2) the receiving water's customary beneficial uses. This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit *and accompanying fact sheet* for public evaluation before issuing an NPDES permit.

PUBLIC ROLE in the Permit

Ecology makes the draft permit and fact sheet available for public review and comment at least 30 days before issuing the final permit to the facility operator (WAC 173-220-050). Copies of the fact sheet and draft permit for Port of Olympia/East Bay Development, NPDES permit WA 0040231**,** are available for public review and comment from insert month day, year until the close of business month day, year. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement**.

Before publishing the draft NPDES permit, Port of Olympia/East Bay Development, reviewed it for factual accuracy. Ecology corrected any errors or omissions about the facility's location, product type or production rate, discharges or receiving water, or its history.

After the public comment period closes, Ecology will summarize substantive comments and our responses to them. Ecology will include our summary and responses to comments to this Fact Sheet as **Appendix D - Response to Comments**, and publish it when issuing the final NPDES permit. Ecology will not revise the rest of the fact sheet, but the full document will become part of the legal history contained in the facility's permit file.

Mohsen Kourehdar, P.E. prepared the permit and this fact sheet.

SUMMARY

The Port of Olympia plans to develop a 13-acre Site on the south end of the Port peninsula; adjacent to the East Bay of Budd Inlet in Olympia. It is currently investigating the soil and groundwater under Model Toxics Control Act (MTCA) Agreed Order (AO) No. DE5471. The Following chemicals of concern (COC) were considered to set permit limits: turbidity, carcinogenic polycyclic aromatic hydrocarbons (cPAHs), arsenic and 2,3,7,8-tetra-chlorodibenzo-p-dioxin.

The proposed NPDES permit regulates the discharge of treated groundwater and stormwater generated during construction of the road ways and utilities. The wastewater treatment system consists of settling tanks, sand filters, bag filters and activated carbon units.

The proposed permit includes a human health based permit limit for benzo (a) pyrene and water quality based permit limits for turbidity and arsenic. Ecology used benzo (a) pyrene as an indicator parameter to represent the removal of organic chemicals. Ecology set the permit limit for pH based on technology. The Port will meet the proposed permit effluent limits at the end of the pipe without a mixing zone.

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I. INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the state of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

Ecology adopted rules describing how it exercises its authority:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC)
- Water quality criteria for surface waters (chapter 173-201A WAC) and for ground waters (chapter 173-200 WAC)
- Sediment management standards (chapter 173-204 WAC)
- Submission of Plans and Reports for Construction of Wastewater Facilities (chapter 173-240 WAC)

These rules require any industrial facility operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for performance requirements imposed by the permit.

Under the NPDES permit program and in response to a complete and accepted permit application Ecology must prepare a draft permit and accompanying fact sheet, and make them available for public review before final issuance. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments, during a period of thirty days (WAC 173-220-050). (See **Appendix A--Public Involvement** for more detail about the Public Notice and Comment procedures). After the Public Comment Period ends, Ecology may make changes to the draft NPDES permit in response to comments. Ecology will summarize the responses to comments and any changes to the permit in **Appendix D.**

II. BACKGROUND INFORMATION

Table 1: General Facility Information

Applicant:	Port of Olympia/East Bay Development
Facility Name and Address:	East Bay Development 315 Jefferson Street NE Olympia, WA 98501
Type of Treatment:	Settling tanks, Sand Filters, Bag Filters, and Granular Activated Carbon
SIC Code	9199
Discharge Location:	Budd Inlet/East bay Latitude: 47º 02' 56" N Longitude: 122º 53' 44" W
Water Body ID Number:	1224819475188

Figure 1. East Bay Redevelopment Site location.

A. Facility Description

History

The 13-acre Site is located on the south end of the Port peninsula, adjacent to the East Bay of Budd Inlet. Figure 1 shows the site and vicinity map.

The site, generally located at 315 Jefferson Street NE was used for timber-related industries from the late 1880s until 1968. Previous industries included sawmill, planning mill, shingle mill and plywood manufacturers. From 1968 to the present, the site was used for commercial and light industrial activities and storage. Historic site activities caused soil and groundwater contamination. Port sampling measured total petroleum hydrocarbons (TPHs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), dioxins and furans and metals at levels above Model Toxics Control Act (MTCA) levels in soil. It has also measured TPHs, SVOCs, PCBs and metals in groundwater above MTCA levels.

The Port of Olympia entered the Voluntary Cleanup Program in January 2007. Ecology transferred the site to a formal cleanup process in February 2008 to expedite the cleanup and to ensure Ecology oversight. Ecology and the Port entered into Agreed Order DE5471 in October 2008. The Agreed Order is a legal document that requires the Port to:

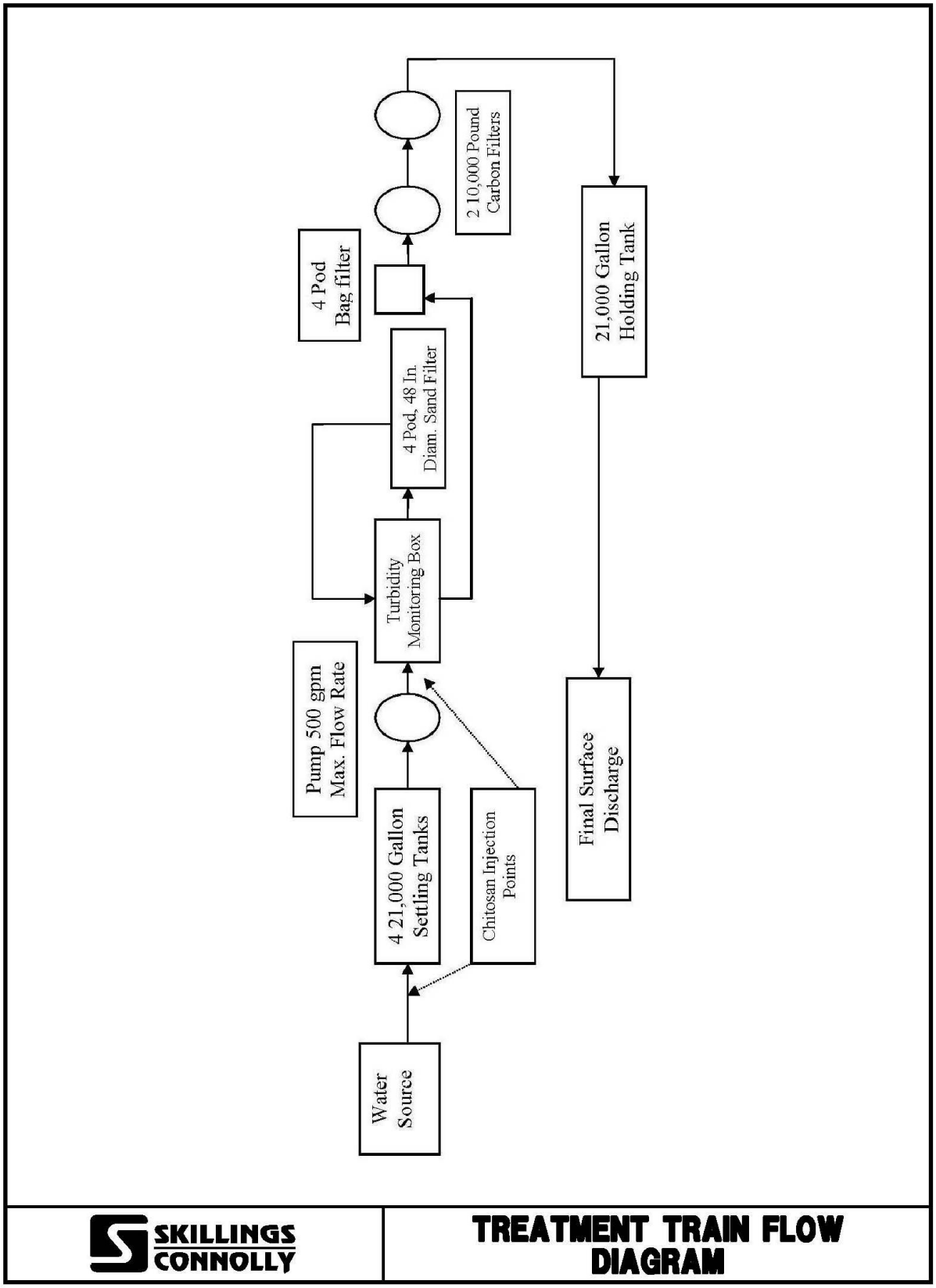
- Develop a draft Remedial Investigation (RI) work plan outlining how it will determine the nature and extent of contamination.
- Conduct a Remedial Investigation and prepare an RI report.
- Prepare a work plan.
- Conduct an interim action (partial cleanup) to remove contaminated soil.

The Port of Olympia plans to develop this site. The proposed NPDES permit regulates the discharge of treated groundwater and stormwater generated only during the construction of the roadways and utilities as a part of development. It also requires the Port to properly manage the stormwater run-off from the contaminated soil stock pile (s) through the use of Best Management Practices (BMPs). The Port expects to start the project in the spring 2009 and complete it by the end of 2009.

Wastewater Treatment

The treatment system consists of influent settling storage tanks, sand filtration, bag Filtration, activated carbon, and post-treatment storage tank prior to discharge to Budd Inlet via an existing storm drain, outfall 001. Figure 2 shows the flow diagram of the treatment system

The Port sized the facility to treat stormwater at a rate of 500 gallons per minute (gpm). It provided these size requirements to Rain for Rent, a company that specializes in temporary wastewater treatment systems. The Port chose this rate to allow for unforeseen soil and hydrogeologic conditions, including unexpected flow from artesian wells, and to allow the maximum flexibility to the contractor.


Water Source
4 21,000 Gallon Settling Tanks
Chitosan Injection Points
Pump 500 gpm Max. Flow Rate
Turbidity Monitoring Box
4 Pod, 48 In. Diam. Sand Filter
4 Pod Bag filter
2 10,000 Pound Carbon Filters
21,000 Gallon Holding Tank
Final Surface Discharge
SKILLINGS CONNOLLY
TREATMENT TRAIN FLOW DIAGRAM

Discharge Outfall

The Port will discharge effluent into East Bay of Budd Inlet via a storm drain as shown in Figure 1.

B. Permit Status

This is a new permit. The Port of Olympia submitted an application for a NPDES permit on January 7, 2009. Ecology accepted it as complete on January 15, 2009. The engineering design report was submitted to Ecology on December 29, 2008, and approved by Ecology on January 26, 2009.

C. Wastewater Characterization

In a letter dated July 17, 2008, Ecology informed the Port of Olympia that in order to meet water quality based permit limits it must use an all known, available, and reasonable methods of prevention, control and treatment (AKART) to treat the water generated during construction trenching of the site. Ecology recommended that suspended solid removal followed by activated carbon treatment would qualify as an AKART.

In response to Ecology letter, the Port of Olympia conducted a pilot study in 2008 to:

- Characterize the influent and effluent concentrations of COC.
- Estimate the groundwater volume it will produce due to construction trenching.
- Estimate the effectiveness of the treatment system to remove COC from the influent.

The Port conducted a short term pilot study by excavating two test pits in two areas of the site and converting these test pits to temporary dewatering wells. One test pit was located in an area with a tidal influence and one was located in an area where the Port did not anticipate a tidal influence. The treatment system used in the pilot study included sock filters, settling tanks, followed by activated carbon filters. The Port summarized the details of the pilot study results in a report titled "Pilot Dewatering Test, Port of Olympia East Bay Site, dated November 5, 2008."

The Port collected and analyzed a total of five influent/effluent samples for semivolatile organic compounds (SVOCs), priority pollutants metals including arsenic, cadmium, copper, lead, nickel, mercury, selenium, silver, and zinc. The influent/effluent samples were also tested for turbidity, pH, and total dissolved solids.

The Port conducted a pilot study on September 23-24 and on October 18-19 in 2008. During the October study, it collected and ran approximately 15,000 gallons of water through the treatment system which was sufficient volume to test the system. It drew the following conclusions from the pilot studies:

1. The influent/effluent test results showed the activated carbon filter effectively removed the organics from the influent.

The September influent/effluent test results showed the treatment system (the chitosan sock filter and the settling tank) did not effectively remove the metals from the influent. In one case the influent arsenic concentration (45 µg/L) was lower than the effluent concentration (95 µg/L). The average turbidity for influent/effluent was approximately 185 NTU and the copper was non-detect at a 20 µg/L quantitation level. A quantitation level of 20 µg/L for copper did not allow the Port to compare the effluent data with the water quality criteria and determine compliance.

2. The October results showed the system effectively removed metals from the influent. The effluent results in Table 2 show the only exceedances of water quality criterion were for copper and nickel.

3. The data showed that the turbidity and metals data in the influent and effluent were correlated. Removal of additional turbidity would lead to better metals effluent concentrations. Therefore, the Port plans to add sand filters to the full scale treatment train to provide better turbidity removal.

In order to characterize the influent/effluent and get information on the effectiveness of the treatment system the proposed permit requires the Port to measure influent/effluent cadmium, copper, lead, nickel, and zinc monthly for six months, and daily for two weeks during the initial shakedown period. After 6 months Ecology will evaluate the results and conduct the reasonable potential calculations. If the calculation shows reasonable potential for any metals, Ecology will calculate water quality based permit limit (s) and modify the permit. If the calculations show no reasonable potential to violate the surface water quality criteria, the metals monitoring requirements will be eliminated. Ecology expects that the effluent will meet water quality standards with the planned additional sand filters.

Table 2: Influent/Effluent Wastewater Characterization and comparison with Water Quality Acute, Chronic and Human Health Criteria.

Chemical of Concern	Treatment Facility Influent Levels, µg/L	Treatment Facility Effluent Levels, µg/L	Water Quality Criteria, µg/L
Arsenic	45	4	36[1]
Cadmium	2U	1U	9.3[1]
Copper	120	5	3.1[1]
Lead	71	5U	8.1[1]
Nickel	48	10	8.2[1]
Mercury	0.2U	0.02U	0.025[1]
Selenium	100	13	71[1]
Silver	20U	1U	1.90[2]
Zinc	160	20U	81[1]
Bis (2-Ethylhexyl) Phthalate	1.4U	1.5U	5.9[3]
Benzo (a) Pyrene	0.22	0.020U	0.031[3]
Benzo (a) Anthracene	0.20	0.030U	0.031[3]
Benzo (b) Fluoranthene	0.20	0.040U	0.031[3]
Benzo (k) Fluoranthene	0.10	0.030U	0.031[3]
Chrysene	0.20	0.020U	0.031[3]
Dibenzo (a,h) Anthracene	0.029U	0.030U	0.031[3]
Indeno (1,2,3-cd) Pyrene	0.14	0.030U	0.031[3]
pH	6.7	6.7	7-8.5[4]
Turbidity	193 NTU	7.3 NTU	12.3[4]
1. Chronic Water Quality Criteria			
2. Acute Water Quality Criteria			
3. Human Health Criteria			
4. The aquatic Life Uses & Associated Criteria			

U = Undetected at quantitation level
NTU = Nephelometric Turbidity Units

D. Description of the Receiving Water

The Port of Olympia/East Bay Development discharges to inner Budd Inlet. Inner Budd Inlet is listed on the 303(d) list as impaired for low dissolved oxygen, pH, fecal coliform, temperature and ammonia-N for water and benzo (a) anthracene, benzo (b) fluoranthene, benzo (k) fluoranthene, chrysene, and total polychlorinated bi-phenols (PCBs) for tissue.

Ecology is currently developing a total maximum daily load (TMDL) for the Deschutes River, Capitol Lake, and Budd Inlet for temperature, fecal coliform bacteria, dissolved oxygen, pH, PCBs, and phosphorus. This discharge would not adversely affect the waterbodies ability to meet standards for the listed parameters.

The ambient background data used for this permit is from the background data measured by the Port in January 2009:

Table 3: Ambient Background Data

Parameter	Value used
Turbidity	2.3 NTU

E. SEPA Compliance

The Port filed a SEPA checklist with the Ecology on March 5, 2009, and the Ecology issued a determination of non-significance (DNS). Ecology will public notice the DNS from March 16 to April 16, 2009.

III. PROPOSED PERMIT CONDITIONS

Federal and State regulations require that effluent limits in an NPDES permit must be either technology or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).

- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC) or the National Toxics Rule (40 CFR 131.36).

- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants**.** Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Nor does Ecology usually develop permit limits for pollutants that were not reported in the permit application but that may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the five-year permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology, as described in 40 CFR 122.42(a), if significant changes occur in any constituent. Industries may be in violation of their permit until Ecology modifies the permit to reflect additional discharge of pollutants.

A. Technology-Based Effluent Limits

The Port of Olympia conducted a pilot study to determine the effectiveness of the treatment system to remove COC from the influent and develop a design flow for the treatment system. The pilot system used settling tanks with baffles to remove suspended solid and activated carbon to remove organics. The Port developed the information in Table 4 based on the pilot study. The values in Table 4 show that the treatment system removed approximately 96 percent of turbidity in the influent and approximately 90 percent of carcinogenic PAHs. Based on the pilot study, the Port of Olympia modified the design to add sand filters to better remove the turbidity during full scale operation. The sand filter should also remove metallic parameters associated with suspended solids.

Based on the information provided in the engineering report, knowledge of COC in the site's soil and groundwater, and data in Table 4, Ecology determined the proposed system constitutes all known, available, and reasonable methods of prevention, control and treatment (AKART) for the groundwater and stormwater that the Port will generate during construction activity to install roadways and utilities. The Port developed Table 4 with limited data. The proposed permit requires influent/effluent testing to collect more information on the treatment system performance.

Table 4: The treatment system removal efficiency determined during the pilot study.

Chemical of Concern	Treatment Facility Influent Levels, µg/L	Treatment Facility Effluent Levels, µg/L	Percent Reduction
Arsenic	45	4	91
Cadmium	2U	1U	-
Copper	120	5	96
Lead	71	5U	96
Nickel	48	10	79
Mercury	0.2U	0.02U	-
Selenium	100	13	87
Silver	20U	1U	-
Zinc	160	20U	94
Bis (2-Ethylhexyl) Phthalate	1.4U	1.5U	-
Benzo (a) pyrene	0.22	0.020U	95
Benzo (a) Anthracene	0.20	0.030U	93
Benzo (b) Fluoranthene	0.20	0.040U	90
Benzo (k) Fluoranthene	0.10	0.030U	85

Chemical of Concern	Treatment Facility Influent Levels, µg/L	Treatment Facility Effluent Levels, µg/L	Percent Reduction
Chrysene	0.20	0.020U	95
Dibenzo (a,h) Anthracene	0.029U	0.030U	-
Indeno (1,2,3-cd) Pyrene	0.14	0.030U	89
pH	6.7	6.7	-
Turbidity	193 NTU	7.3 NTU	96

U = Undetected at Quantitation level
NTU= Nephelometric Turbidity Units (NTU)

B. Surface Water Quality-Based Effluent Limits

The Washington State Surface Water Quality Standards (chapter 173-201A WAC) were designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet established surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily loading study (TMDL).

Numerical Criteria for the Protection of Aquatic Life and Recreation

Numerical water quality criteria are published in the Water Quality Standards for Surface Waters (chapter 173-201A WAC). They specify the levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numerical criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

Numerical Criteria for the Protection of Human Health

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (40 CFR 131.36). These criteria are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The Water Quality Standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative Criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.

- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200, 2006) and of all marine waters (WAC 173-201A-210,; 2006) in the State of Washington.

Antidegradation

The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three Tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

Because this is a new discharge, Ecology must determine whether or not it must meet Tier II requirements. Because the proposed permit requires the discharge to meet water quality and human health criteria it should not cause a measureable change in the Inner Budd Inlet.

The preliminary data in Table 1 shows the only exceedances of water quality criterion were for copper and nickel. It also shows a direct correlation between turbidity and metal concentrations in the influent and effluent. Ecology expects that the discharge will meet water quality standards with the addition of sand filtration. The proposed permit requires the Port to measure turbidity in Budd Inlet monthly. It will evaluate the turbidity data along with effluent data to confirm that the effluent meets water quality standards.

Ecology’s analysis described in this section of the fact sheet demonstrates that the proposed permit conditions will protect the existing and designated uses of the receiving water so the facility will meet Tier I requirements.

Mixing Zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric criteria, so long as the diluting wastewater doesn’t interfere with designated uses of the receiving water body (e.g., recreation, water supply, and aquatic life and wildlife habitat, etc.). The pollutant concentrations outside of the mixing zones must meet water quality numeric criteria.

The Port of Olympia will implement AKART to treat the contaminated groundwater and stormwater generated during construction. Ecology determined that the effluent will meet water quality criteria in the discharge and therefore, the permit does not include a mixing zone.

C. Designated Uses and Surface Water Quality Criteria

- Aquatic life uses are designated using the following general categories. All indigenous fish and non-fish aquatic species must be protected in waters of the state.

  (a) **Extraordinary quality** salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.

  (b) **Excellent quality** salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.

  (c) **Good quality** salmonid migration and rearing; other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.

  (d) **Fair quality** salmonid and other fish migration.

  The Aquatic Life Uses for this receiving water are identified below.

Table 5: Aquatic Life Uses & Associated Criteria

Good quality	
Temperature Criteria – Highest 1D MAX	19°C (66.2°F)
Dissolved Oxygen Criteria – Lowest 1 Day Minimum	5.0 mg/L
Turbidity Criteria	• 10 NTU over background when the background is 50 NTU or less; or • A 20 percent increase in turbidity when the background turbidity is more than 50 NTU.
pH Criteria	pH must be within the range of 7.0 to 8.5 with a human-caused variation within the above range of less than 0.5 units.

- To protect **shellfish harvesting**, fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, and not have more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 colonies/100 mL.

- The **recreational uses** are primary contact recreation and secondary contact recreation.

The recreational uses for this receiving water are identified below.

Table 6 Recreational Uses

Secondary Contact Recreation	Enterococci organism levels must not exceed a geometric mean value of 70 colonies/100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 208 colonies/100 mL.

- The **miscellaneous marine water uses** are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

D. Evaluation of Surface Water Quality - Based Effluent Limits for Numeric Criteria

pH-- Compliance with the technology-based limits of 6.0 to 9.0 will assure compliance with the water quality standards of surface waters because of the high buffering capacity of marine water.

Turbidity--The groundwater and stormwater generated during the construction activity will have high turbidity. The treatment system is designed to remove turbidity. The water quality criteria for turbidity are 10 NTU over background when the background is 50 NTU or less or a 20 percent increase in turbidity when the background turbidity is more than 50 NTU.

The Port obtained background turbidity when it sampled the West Bay of Budd Inlet in January 2009. The Port measured turbidity 1000 feet up-gradient in an unaffected area during a sediment dredging operation. It collected a total of 12 samples to measure turbidity at the surface, and at approximately 25 feet and 50 feet below the surface. The average background turbidity was 2.3 NTU which Ecology used to calculate a water quality based permit limit of 12.3 NTU. As shown in Table 4, the pilot study measured effluent turbidity after treatment was 7.3 NTU. The Port estimated the treatment system turbidity removal on limited operation time and more sampling will provide a better understanding of the treatment system, influent and effluent characteristics.

Ecology has identified the carcinogenic PAHs, 2,3,7,8-tetra-chlorodibenzo-p-dioxin and arsenic as chemicals of concern at the site and because of their tendency to adsorb to particulates, Ecology determined that turbidity is the most important parameter to remove prior to discharge. In addition to the treatment system employed during the pilot study, the Port added sand filters to maximize solids removal. The Port will continuously monitor the influent and effluent for turbidity to provide information to the operator concerning turbidity removal. The proposed permit includes a requirement for continuous monitoring of turbidity.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

The following toxic pollutants may be present in the discharge:

Arsenic: The treatment system during the pilot study has achieved an arsenic effluent concentration of 4 µg/L and the marine chronic water quality criterion for arsenic is 36 µg/L. The Port has detected arsenic during the site's soil and groundwater investigation consistently, therefore, it a COC. Because the predicted effluent concentration of 4 µg/L is based on limited treatment system operation time, Ecology used best professional judgment and applied the acute water quality criteria of 36 µg/L to limit arsenic in the effluent.

Copper: The marine chronic water quality criterion for copper is 3.1 µg/L. The treatment system during the pilot study has achieved a copper concentration of 5 µg/L. Ecology has not identified copper as a COC during the site's soil and groundwater investigation. The proposed permit requires the Port to collect more information.

Cadmium and Lead: Ecology has identified these parameters as COC during the site's soil and groundwater investigation. The chronic water quality criteria for cadmium and lead are 9.3 µg/L and 8.1 µg/L, respectively. Table 2 shows that the pilot treatment system met the chronic water quality criteria for these two parameters. Therefore, Ecology did not propose permit limits. The proposed permit requires the Port to collect more information for cadmium and copper.

Mercury, Selenium, and Silver and Zinc: These parameters are not identified during the soil and groundwater investigation and are not COC for the site. In addition, the measured values in Table 3 shows values below acute and chronic water quality criterions for each parameter, therefore, the permit will not have any limits for these parameters. The proposed permit requires the Port to collect more information for zinc, because the pilot study results were not conclusive.

Nickel. Ecology has not identified nickel as a COC during the site's soil and groundwater investigation. But the pilot study showed nickel may exceed the water quality criteria as shown in Table 2, therefore, the permit will have monitoring requirements.

At this time due to limited effluent metals data from the pilot study, Ecology did not conduct the reasonable potential calculations. The proposed permit requires the Port to measure influent/effluent for cadmium, copper, lead, nickel, and zinc monthly for six months and daily for two weeks during the shakedown period. After 6 months, Ecology will conduct the reasonable potential calculations. If the calculations show reasonable potential for any metal to violate water quality standard, Ecology will calculate a permit limit and modify the permit. If the calculations show no reasonable potential to violate the surface water quality criteria, the monitoring requirements will be eliminated.

E. Whole Effluent Toxicity

The water quality standards for surface waters forbid discharge of effluent that causes toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

- *Acute toxicity tests measure mortality as the significant response* to the toxicity of the effluent. Dischargers who monitor their wastewater using acute toxicity tests find early indications of any potential lethal effect of the effluent on organisms in the receiving water.

- *Chronic toxicity tests measure various sublethal toxic responses* such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test on an organism with an extremely short life cycle, or a partial life cycle test during a critical stage of a test organism's life. Some chronic toxicity tests also measure organism survival.

Using the screening criteria in WAC 173-205-040, Ecology determined that Port of Olympia/East Bay Development's effluent has the potential to cause aquatic toxicity. The proposed permit contains WET testing requirements as authorized by RCW 90.48.520 and 40 CFR 122.44, using procedures from WAC

173-205. The proposed permit requires the facility to conduct WET testing at prescribed intervals semiannually for one year, to characterize both the acute and chronic toxicity of the effluent.

If the year of WET testing shows acute or chronic toxicity levels that have a reasonable potential to cause receiving water toxicity, then the proposed permit will:

- Set a limit on acute or chronic toxicity.
- Require this facility operator to conduct WET testing to monitor compliance with an acute toxicity limit, a chronic toxicity limit, or both.
- Specify the procedures the facility operator must use to come back into compliance if toxicity exceeds the limits.

Ecology-accredited WET testing laboratories use the proper WET testing protocols, fulfill the data requirements, and submit results in the correct reporting format. Accredited laboratory staff know how to calculate an NOEC, LC_{50}, EC_{50}, IC_{25}, etc. Ecology gives all accredited labs the most recent version of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* (http://www.ecy.wa.gov/biblio/9580.html), which is referenced in the permit. Ecology recommends that each regulated facility send a copy of the acute or chronic toxicity sections(s) of its NPDES permit to the laboratory.

F. Human Health

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria.

Ecology determined the effluent may contain chemicals of concern posing a risk to human health. Ecology determined from the pilot study that regulated chemicals occur in the discharge. The receiving water is a water body that is 303(d) listed (quality impaired) for chemicals, benzo(a) anthracene, benzo(b) fluoranthene, benzo(k) fluoranthene and chrysene in tissue. The Port has detected these chemicals in the influent as shown in Table 2.

Ecology conducted a determination of the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and Ecology's Permit Writer's Manual (Ecology Publication 92-109, July, 2006) to make this reasonable potential determination.

Our evaluation showed that the discharge has no reasonable potential to cause a violation of human health water quality standards for carcinogenic PAHs (Benzo (a) pyrene, Benzo (a) Anthracene, benzo (b) fluoranthene, benzo(k) fluoranthene and chrysene , dibenzo (a,h) anthracene, and indeno (1,2,3-cd) pyrene. The spreadsheet for reasonable potential calculations for carcinogenic PAHs is shown in Appendix C.

Even though the reasonable potential calculations showed effluent limits are not warranted, Ecology included a limit for benzo (a) pyrene as an indicator parameter to ensure proper operation of the treatment system to remove carcinogenic PAHs and organic chemicals. The proposed permit includes a maximum daily limit for benzo (a) pyrene of 0.031µg/L which is the human health water quality based criteria.

Dioxins: The Port has detected dioxins in the soil during site investigation. Ecology asked the Port of Olympia to sample and test a groundwater sample to determine if dioxins found in the soil at the site have partitioned into groundwater. The groundwater sample was non-detect for 2,3,7,8-tetra-chlorodibenzo-p-dioxin (2,3,7,8-TCDD) at a method reporting limit (Quantitation level) of 9.59 picograms/liter (pg/L). Ecology's permit writers manual list the method detection level as 1.3 pg/L and quantitation level of 5 pg/L using Method 1613 B. The human health criteria for 2,3,7,8-TCDD is 0.014 pg/L.

The proposed permit requires influent and effluent testing one time, to characterize the influent and effluent for concentration for 2,3,7,8- TCDD. The proposed permit specifies method detection and quantitation levels of 1.3 pg/L and 5 pg/L, respectively, consistent with the values in the permit writer manual.

The data has shown dioxins have an affinity for particulates and readily partition to particles in air and water and soil. Turbidity removal is the key to remove dioxins from the influent. Ecology does not expect that the Port will detect 2,3,7,8-TCDD in this effluent with proper operation of the treatment system.

Arsenic: In 1992 the USEPA adopted risk-based arsenic criteria for the protection of human health for the State of Washington. The criterion for marine waters is 0.14 μg/L inorganic arsenic, and is based on exposure from fish and shellfish tissue ingestion. The freshwater criterion is 0.018 μg/L, and is based on exposure from fish and shellfish tissue and water ingestion. These criteria have caused confusion in implementation because they differ from the drinking water maximum contaminant level (MCL) of 10 μg/L, which is not risk-based, and because the human health criteria are sometimes exceeded by natural background concentrations of arsenic in surface water and ground water.

In Washington, when a natural background concentration exceeds the criterion, the natural background concentration becomes the criterion, and no dilution zone is allowed. This could result in a situation where natural groundwater or surface water used as a municipal or industrial source-water would need additional treatment to meet numeric effluent limits even though no arsenic was added as waste. Although this is not the case for all dischargers, we do not have data at this time to quantify the extent of the problem.

A regulatory mechanism to deal with the issues associated with natural background concentrations of arsenic in groundwater-derived drinking waters is currently lacking. Consequently, the Water Quality Program, at this time, has decided to use a three-pronged strategy to address the issues associated with the arsenic criteria. The three strategy elements are:

1. **Pursue, at the national level, a solution to the regulatory issue of groundwater sources with high arsenic concentrations causing municipal treatment plant effluent to exceed criteria.** The revision of the drinking water MCL for arsenic offered a national opportunity to discuss how drinking water sources can affect NPDES wastewater dischargers, however Ecology was unsuccessful in focusing the discussion on developing a national policy for arsenic regulation that acknowledges the risks and costs associated with management of the public exposure to natural background concentrations of arsenic through water sources. The current arsenic MCL of 10 μg/L could also result in municipal treatment plants being unable to meet criteria-based effluent limits. Ecology will continue to pursue this issue as opportunities arise.

2. **Additional and more focused data collection**. The Water Quality Program will in some cases require additional and more focused arsenic data collection, will encourage or require dischargers to test for source water arsenic concentrations, and will pursue development of a proposal to have Ecology's Environmental Assessment Program conduct drinking water source monitoring as well

as some additional ambient monitoring data. At this time, Washington NPDES permits will contain numeric effluent limits for arsenic based only on treatment technology and aquatic life protection as appropriate.

Data sharing. Ecology will share data with USEPA as they work to develop new risk-based criteria for arsenic and as they develop a strategy.

G. Sediment Quality

The aquatic sediment standards (WAC 173-204) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400).

Through a review of the effluent characteristics, Ecology determined that this discharge has no reasonable potential to violate the Sediment Management Standards.

GROUND WATER

H. Ground Water Quality Limits

The Ground Water Quality Standards, (chapter 173-200 WAC), protect beneficial uses of ground water. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100).

The Port of Olympia/East Bay Development does not discharge wastewater to ground and therefore Ecology imposed no permit limits to protect ground water.

IV. MONITORING REQUIREMENTS

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

A. Lab Accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories* to prepare all monitoring data (with the exception of certain parameters).

B. Effluent Limits Which are Near Detection or Quantitation Levels

The human health based water quality effluent concentration limit for benzo (a) pyrene are near the limits of current analytical methods to detect or accurately quantify. The method detection level (MDL) is the minimum concentration of a pollutant that can be measured and reported with a 99 percent confidence that its concentration is greater than zero (as determined by a specific laboratory method). The quantitation level is the level at which concentrations can be reliably reported with a specified level of error. Estimated concentrations are the values between the MDL and the QL. Ecology requires estimated concentrations to be reported. When reporting maximum daily effluent concentrations, Ecology requires the facility to report "less than X" where X is the required detection level if the measured effluent concentration falls below the detection level. When calculating average monthly concentrations, the facility must use all the effluent concentrations measured below the quantitation level but above the method detection level.

V. OTHER PERMIT CONDITIONS

A. Reporting and Recordkeeping

Ecology based permit condition S3 on our authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

B. Spill Plan

This facility stores a quantity of chemicals on-site that have the potential to cause water pollution if accidentally released. Ecology can require a facility to develop best management plans to prevent this accidental release [section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080].

The proposed permit requires this facility to develop and implement a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs.

C. Solid Waste Control Plan

Port of Olympia/East Bay Development could cause pollution of the waters of the state through inappropriate disposal of solid waste or through the release of leachate from solid waste.

This proposed permit requires this facility to develop a solid waste control plan to prevent solid waste from causing pollution of waters of the state. The plan must be submitted to Ecology for approval (RCW 90.48.080). A focus sheet on preparing a solid waste control plan can be found in http://www.ecy.wa.gov/pubs/0710024.pdf.

In addition, the solid waste control plan should specifically address the handling and disposal of the solid/sludge generated from the groundwater/stormwater treatment system.

D. Treatment System Operating Plan

Ecology requires industries to take all reasonable steps to properly operate and maintain their wastewater treatment system in accordance with state and federal regulations (40 CFR 122.41(e) and WAC 173-220-150 (1)(g)). The facility will prepare and submit an operation and maintenance manual as required by state regulation for the construction of wastewater treatment facilities (WAC 173-240-150). Implementation of the procedures in the Treatment System Operating Plan ensures the facility's compliance with the terms and limits in the permit.

E. Stormwater Pollution Prevention Plan/ Best Management Practices

Ecology wrote the proposed permit to manage groundwater and stormwater generated during construction activity to install roadways and utilities corridors for future development. During trenching activity the Port will excavate contaminated soil and store it at the site while construction is in progress. The engineering design report has outlined Best Management Practices (BMPs) to contain and address the run-on and run-off to and from the contaminated soil stock pile(s). These BMPs are directly from Stormwater Management Manual for Western Washington (revised 2005). The proposed permit includes these conditions to manage stormwater runoff from the site. The proposed permit also requires the Port to include these conditions in the bid package for hiring a contractor.

These BMPs are:

Site Runoff Prevention BMPs

The site is currently graded in such a way that runoff will not flow over ground to Budd Inlet. Stormwater currently enters the storm system through catch basins on site, which then discharge to Budd Inlet. The Port will prevent discharge of untreated stormwater to Budd Inlet during construction through the use of silt fences, plugging existing catch basins, and berms. Stormwater will either infiltrate on site, or be treated with the onsite treatment system prior to discharge into Budd Inlet. The Port has estimated that it will treat approximately 5 gpm of stormwater at the treatment facility.

Treatment of Contaminated Soil: The Port will store contaminated soil at the site during the construction project. The following is a list of Ecology approved Best Management Practices (BMPs) that the Contractor must choose from to contain and address the run-on and run-off to and from the contaminated stock pile.

- **Pollutant Control Approach:** Provide impervious containment with berms, dikes, etc. and/or cover to prevent run-on and discharge of leachate pollutant(s) and TSS. (BMPs C123: Plastic Covering and C208: Triangular Silt Dike).

- **Applicable Operational BMP:** Do not hose down the contained stockpile area to a storm drain or a conveyance to a storm drain or to a receiving water.

- **Applicable Structural Source Control BMP Options:** Choose, by what is appropriate to the site, one or more of the source control BMP options listed below for stockpiles greater than 5 cubic yards.

    - Store in a building or paved and bermed covered area.

    - Place temporary plastic sheeting (polyethylene, polypropylene, hypalon, or equivalent) over the material.

    - Pave the area and install a stormwater drainage system. Place curbs or berms along the perimeter of the area to prevent the run-on of uncontaminated stormwater and to collect and convey runoff to treatment. Slope the paved area in a manner that minimizes the contact between stormwater (e.g., pooling) and leachable materials in compost, logs, bark, wood chips, etc.

    - For large stockpiles that cannot be covered, implement containment practices at the perimeter of the site and at any catch basins as needed to prevent erosion and discharge of the stockpiled material offsite or to a storm drain. Ensure that contaminated stormwater is not discharged directly to catch basins without conveying through a treatment BMP.

- **Applicable Treatment BMP:** Convey contaminated stormwater from the stockpile area to a wet pond, wet vault, settling basin, media filter, or other appropriate treatment system depending on the contamination.

- **Recommended Additional Operational BMPs:**

    - Maintain drainage areas in and around storage of contaminated soil stock pile with a minimum slope of 1.5 percent to prevent pooling and minimize leachate formation. Areas should be sloped to drain stormwater to the perimeter where it can be collected, or to internal drainage “alleyways” where material is not stockpiled.

- Sweep paved storage areas regularly for collection and disposal of loose solid materials.
- If and when feasible, collect and recycle water-soluble materials (leachates) to the stockpile.
- Stock cleanup materials, such as brooms, dustpans, and vacuum sweepers near the storage area.

G. General Conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual industrial NPDES permits issued by Ecology.

VI. PERMIT ISSUANCE PROCEDURES

A. Permit Modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for ground waters, after obtaining new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

B. Proposed Permit Issuance

This proposed permit includes all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the State of Washington. Ecology proposes to issue this permit for a term of 5 years.

VII. REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Washington State Department of Ecology.

2007. Focus Sheet on Solid Waste Control Plan, Developing a Solid Waste Control Plan for Industrial Wastewater Discharge Permittees. Publication Number 07-10-024

Washington State Department of Ecology.

Laws and Regulations(http://www.ecy.wa.gov/laws-rules/index.html)

Permit and Wastewater Related Information
(http://www.ecy.wa.gov/programs/wq/wastewater/index.html

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

Ecology proposes to issue a permit to Port of Olympia/East Bay Development. The permit prescribes operating conditions and wastewater discharge limits. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology placed a Public Notice of Application on January 26, 2009, and February 2. 2009, in the *Olympian* to inform the public about the submitted application and to invite comment on the issuance of this permit.

Ecology will place a Public Notice on date in the *Olympian* to inform the public and to invite comment on the proposed issuance of this National Pollutant Discharge Elimination System permit as drafted.

The Notice –

- Tells where copies of the draft Permit and Fact Sheet are available for public evaluation (a local public library, the closest Regional or Field Office, posted on our website.).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Asks people to tell us how well the proposed permit would protect the receiving water.
- Invites people to suggest fairer conditions, limits, and requirements for the permit.
- Invites comments on Ecology's determination of compliance with antidegradation rules.
- Urges people to submit their comments, in writing, before the end of the comment period
- Tells how to request a public hearing about the proposed NPDES Permit.
- Explains the next step(s) in the permitting process.

Ecology has published a document entitled **Frequently Asked Questions about Effective Public Commenting** which is available on our website at http://www.ecy.wa.gov/biblio/0307023.html.

You may obtain further information from Ecology by telephone, **360-407-6280**, or by writing to the permit writer at the address listed below.

Industrial Unit Permit Coordinator
Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

The primary author of this permit and fact sheet is Mohsen Kourehdar, P.E**.**

APPENDIX B--GLOSSARY

1-DMax or 1-day maximum temperature--The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

7-DADMax or 7-day average of the daily maximum temperatures--The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

Acute Toxicity--The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

AKART--The acronym for "all known, available, and reasonable methods of prevention, control and treatment." AKART is a technology-based approach to limiting pollutants from wastewater discharges which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual Average Design Flow (AADF)--The average of the daily flow volumes anticipated to occur over a calendar year.

Average Monthly Discharge Limit--The average of the measured values obtained over a calendar month's time.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring--Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Detection Limit--See Method Detection Level.

Dilution Factor (DF)--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limit--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Maximum Day Design Flow (MDDF)--The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum Month Design Flow (MMDF)--The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum Week Design Flow (MWDF)--The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

pH--The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7.0 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Peak Hour Design Flow (PHDF)--The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

Peak Instantaneous Design Flow (PIDF)--The maximum anticipated instantaneous flow.

Quantitation Level (QL)--The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision &bias) achieves the objectives of the intended purpose. This may also be called Minimum Level or Reporting Level.

Reasonable Potential--A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

Responsible Corporate Officer--A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to receiving waters may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Solid waste--All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the facility. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into receiving waters.

APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on Ecology's homepage at http://www.ecy.wa.gov/programs/eap/pwspread/pwspread.html.

Human Health Reasonable Potential to Exceed Calculations/Port of Olympia/East Bay Development																
Revised 3/00	Ambient Concentration (Geometric Mean)	Water Quality Criteria for Protection of Human Health	Max concentration at edge of chronic mixing zone.	LIMIT REQ'D?	Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT	MAXIMUM DAILY EFFLUENT LIMIT	Estimated Percentile at 95% Confidence		Max effluent conc. measure	Coeff Variation		# of samples from which # in col. K was	Multiplier	Calculated 50th percentile Effluent Conc. (When n>10)	Dilution Factor
Parameter	ug/L	ug/L	ug/L			ug/L	ug/L		Pn	ug/L	CV	S	n			
Benzo(a)Pyrene	0.0000	0.03	0.02	NO	1.00	NONE	NONE	0.50	0.05	0.01	0.60	0.6	2	1.50	0.00	1.0
Benzo(a)Anthracene	0.0000	0.03	0.03	NO	1.00	NONE	NONE	0.50	0.05	0.02	0.60	0.6	1	1.50	0.00	1.0
Benzo(b)Fluoranthene	0.0000	0.03	0.03	NO	1.00	NONE	NONE	0.50	0.22	0.02	0.60	0.6	2	1.50	0.00	1.0
Benzo(k)Fluoranthene	0.0000	0.03	0.02	NO	1.00	NONE	NONE	0.50	0.22	0.02	0.60	0.6	2	1.50	0.00	1.0
Chrysene	0.0	0.03	0.02	NO	1.00	NONE	NONE	0.50	0.22	0.01	0.60	0.6	2	1.50	0.00	1.0
Dibenzo(a,h)Anthracene	0.0000	0.03	0.02	NO	1.00	NONE	NONE	0.50	0.22	0.02	0.60	0.6	2	1.50	0.00	1.0
Indeno(1,2,3-cd)Pyrene	0.0000	0.03	0.03	NO	1.00	NONE	NONE	0.50	0.22	0.02	0.60	0.6	2	1.50	0.00	1.0
Column K half the quantitation levels were used.																

APPENDIX D--RESPONSE TO COMMENTS